MISSOURI DEPARTMENT OF TRANSPORTATION
ADULT PASSENGER LIGHT DUTY CUTAWAY
TYPE VEHICLE SPECIFICATIONS
WIDE BODY

1. The intent of these general specifications is to describe a commercial non-school bus type vehicle that will be manufactured, structured and assembled by using best quality materials, components and workmanship in accordance with sound engineering principles and manufacturing practices to provide safe and reliable highway and city transportation for ambulatory and nonambulatory adult passengers.

2. Chassis types - Cutaway Vans, Commercial Cutaways or R.V. Cutaways, 2014 or 2015 model year, General Motors 14,000 GVWR, Ford Super Duty 14,000 GVWR or approved equal. All vehicles must meet GVWR requirements for anticipated passenger load. If for any reason a 2014 model cannot be supplied a 2015 model must be furnished at quoted bid price. This will only be exercised in the event a successful bidder received a purchase order in time to order a chassis and failed to do so. Floor Plan LL may utilize a 158" 14,000 GVWR chassis.

   Minimum 60% domestic content, final assembly processes and final assembly point in USA.

   MoDOT reserves the right to conduct in-plant inspections.

3. Body Exterior - The materials used and the assembly method of the roof, side panels, and floor will be the manufacturer's standard construction, uniformly connected, lapped and sealed providing a weather and dust proof body. Drip rails shall be installed above all doors to prevent water leakage into bus. Drip rails will be 3/4" or more in width. Each vehicle will be thoroughly water tested before delivery. A 23' body is acceptable provided it meets all interior dimensions. Floor Plan LL may be a 21' body. Body width not to exceed 98", excluding wheel flares and mirrors.

   Exterior Color -No vehicle will be painted school bus yellow. Base color will be white.

   Advertisements- A dealer identification decal no larger than 20 inches square inches in area may be displayed on the back of the vehicle and/or under the hood in the engine compartment of the vehicle.

   Vehicle will be warranted against rust through for three years from date of delivery to end user.

4. Body Interior - The inner construction must provide equal protection to passengers regardless of where they are seated.

The inner frame, at the floor, front and rear ends shall be heavy steel construction that will provide solid support for inner crash shield and exterior panels. The frame shall be securely anchored to adequately spaced steel floor cross members.

The entire structure must provide maximum resistance to impact and collision and meet or exceed the rollover protection requirement of all federal regulations. (FMVSS 220).

Interior Color - The interior trim, upholstery, seat belts, visors, and etc., will be color keyed to exterior color.

Headliner - Shall be full length for driver and passenger area. This headliner shall have longitudinal and cross member supports where needed to prevent flexing and vibrations.

Side and End Panels - To be complete on all doors, sidewalls and rear end.

Floor and Floor Covering - The entire floor except driver's area, wheelwells, and stepwells shall be made level from end to end and side to side with marine grade plywood a minimum of 3/4" thick securely installed by glue, screws or a combination of methods that will assure a permanent fitted floor. Fiberglass re-enforced plywood is also acceptable. The plywood floor shall be covered with a minimum of 2.2 mm thick, vinyl transit type floor covering. All seams are to be heat welded. Heat welding only applies when mating of similar surfaces. There will also be an aluminum polyethylene or galvanized, belly pan located under the floor to prevent moisture entrance. Exposed rear wheel wells are acceptable. Floor Plan LL will require a raised floor.

The entranceway and aisle will be non-skid type and under the seats it will be smooth with anti-skid properties. The driver area and wheelhouse covering may be either smooth or anti-skid type. All floor coverings will meet ADA requirements 49 CFR 38.25. Flooring in Securement area will meet ADA requirement 49 CFR 38.25(a) for slip resistance (anti-skid throughout).

Aisles, steps, and floor areas must be slip resistant. [49 CFR Part 38.25(a)]

Step edges, thresholds, and the boarding edge of ramps or lift platforms, when equipped, must have a band of color that contrasts with the step/floor surface. Typically, white or bright yellow is used to contrast against dark floors. [49 CFR Part 38.25(b)]

There will also be a standee line in aisleway that meets Federal Motor Carrier Safety Regulation 49 CFR 393.90.

All exposed edges around the wall, doors and entranceways shall be trimmed with a molding securely attached providing a waterproof seal, or a waterproof sealant providing a waterproof seal.

Insulation - The interior dash firewall, lower panels, doors, floor, sidewalls, roof headliner and etc. shall be insulated.

Grabrails, Stanchions - A floor to ceiling stanchion shall be installed near the aisle and immediately left of the entrance door. This stanchion shall be connected to the vehicle right side by a guardrail approximately 30" above the floor.

Interior handrails and stanchions should not interfere with the path of travel of a common wheelchair from the accessible entrance to the securement areas. [49 CFR Part 38.29(a)]

For vehicles longer than 22 feet, an overhead handrail or handrails shall be provided which are continuous from front to back except for a gap at the rear doorway. [49 CFR Part 38.29(c)]

A floor to ceiling stanchion shall be installed in close proximity to the rear, right side of the driver's seat. This stanchion shall be connected to the vehicle's left hand side wall by a guardrail approximately 30" above the floor. The stanchion and guardrail shall not impair the driver's seat adjustment. Two stanchions with a modesty panel behind the driver’s seat are also acceptable.

A solid material modesty panel shall be provided with the entry door stanchion and guardrail (right hand front seat).

Spacing of these guardrails and panels must provide adequate passenger knee room.

There will also be two overhead grabrails mounted securely above the passenger aisleway. These grabrails will meet ADA requirement 49 CFR 38.29. One overhead rail is acceptable if storage compartment is an issue.

Stepwell Grabrails- There will be two parallel mounted grabrails located along the entire length of the stepwell. The left side grabrail will mounted to the entrance door frame on the lower end and on the floor to ceiling stanchion on the upper end. The right side grabrail will be mounted to the door frame on the lower end and then either securely mounted to a floor to ceiling stanchion or steel mounted to the upper windshield frame. These grabrails shall be approx. 18” in length. All handrails, grabrails and stanchions will meet ADA requirement 49 CFR 38.29.

All stanchions guardrails, grabhandles, and grabrails will be mounted to the floor or ceiling with at least four screws, or at least two screws that are attached to steel mounted backing plates.

All handrails and stanchions will meet ADA requirement 49 CFR 38.29.

Handrails and stanchions shall be provided in the entrance area and through the fare collection area to assist persons with disabilities as they enter and pay a fare. Some portion of this handrail/stanchion system must be able to be grasped from outside the vehicle to assist persons as they start to board. Handrails shall have a cross-sectional diameter of 1 1/4 to 1 1/2 inches, shall provide a minimum of 1 1/2 inches of "knuckle clearance," and shall have eased edges with corner radii of not less than 1/8 inch.

On vehicles 22 feet in length or longer which have fare collection systems, a horizontal assist shall be provided across the front of the vehicle to allow a person to lean against the assist while paying a fare. [49 CFR Part 38.29(b)]

Handrails and stanchions shall also be provided to assist with on-board circulation, sitting and standing, and exiting the vehicle. [49 CFR Part 38.29(b)]

Fareboxes are to be located as far forward as possible and must not obstruct traffic in the vestibule area, particularly wheelchairs and mobility aids. [49 CFR Part 38.33]

For vehicles longer than 22 feet that have front door lifts or ramps, vertical stanchions immediately behind the driver shall either terminate at the lower edge of the aisle-facing seats or be "dog-legged" so that the floor attachment does not impede or interfere with wheelchair footrests. [49 CFR Part 38.29(e)]

If the driver's seat must be passed by a wheelchair user, the pedestal shall not extend into the aisle or vestibule beyond the wheel housing, to the maximum extent practicable. [49 CFR Part 38.29(e)]

Seating, Seat Belts, and Seating Arrangements - See Exhibits AA, CC, DD, FF, GG, HH, II, JJ, and LL. The arrangements shall provide seating as listed and as shown on the appropriate exhibit.

If there is a conflict between the written specification and the floor plan diagram, the written narrative controls. Narrative controls the design.

At least one set of forward-facing seats must be designated as priority seats for persons with disabilities. Signs identifying these as priority seats must be provided. Characters on these signs shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Minimum character height (using a capital X) shall be 5/8 inch. Wide spacing shall be used (generally the space between letters shall be 1/16 the height of upper case letters). Letters must contrast with the sign's background color. [49 CFR Part 38.27(a), 49 CFR Part 38.27(c)]

The driver's seat shall be a power adjustable (vertical and horizontal) high-back bucket type with full depth foam padded seat cushion and backrest covered with a level 3 cloth material. Include a folding armrest on the right-hand side.

The conventional type two-passenger seats shall be a minimum width of 35" and spaced on a minimum of 30" centers. No exceptions will be allowed in seat spacing or width.

One-passenger seats shall be 17" wide.

All passenger seats shall be a minimum depth of 16", the backrests shall be a minimum thickness of 2". All seats frames will be completely painted or powder coated.

All passenger seat cushions and backrests shall be covered with a minimum level 3 vinyl material. Seat cushions and backrests shall have full depth foam padding. The seat cushion padding shall have a density (4" minimum) sufficient to support occupants. Low-back or mid high style seats manufactured by the Freedman, C. E. White Seating Company, or American Seating (or approved equal) will be preferred type. All seats will meet or exceed the requirements of FMVSS 210. Please include testing certification with your bid.

All passenger seats will have folding armrests on the aisle sides.

The walk-through aisle between right and left hand seats shall be a minimum of 14".

The driver and all passenger seats shall have best quality seat belts properly located and easily accessible. The driver's seat belts shall have minimum usable length of 60" measured from the seat cushion to the buckle. All retractable seat belts on the vehicle will have the same size male and female ends. All non-retractable seat belts on the vehicle will have the same size male and female ends. The passenger seat belts will have to be designed to encircle the largest of individuals (minimum usable length of 60"). All seating positions will have 60" seat belts with under seat retractors (no traveling retractors). The permanent front seats will be designated as priority seating. Include three (3) 12” (minimum) extensions with each vehicle that will connect to at least two of the belt styles installed on ambulatory seating.

Cutaways will have two ambulatory seating positions that have non retractable lap belts, for the use with child safety seats. These will be located in the center of the vehicle on the aisle sides of the seats.

All floor plans (except floor plan GG) will have one integrated child seat that will accommodate children between 20 and 60 lbs. This seat will be of a fixed two-passenger design and will be located in the rear of the vehicle. Freedman ICS, American ICS or approved equal will be acceptable.

Fold-A-Way Type Seat Requirements:

Fold-A-Way type seats shall meet all dimensional, structural and testing requirements of the standard seat specification.

All hardware to attach folding seats to the floor shall be recessed and/or positioned to prevent tripping and stumbling.

All seats shall be forward facing for ambulatory passengers and fold against the wall when wheelchair space is required.

In the folded position, the seat may extend into the bus no further than 12" installed at 90 degree to maximize space for wheelchair loading and positioning. A full 30" x 48" free securement area must be maintained.

In the down, fixed position, the seat may not extend into the aisle more than 38" to preserve aisle space, maximum 12" from walls.

Fold-A-Way type seats shall be Braun Series 5, Freedman 3 step Fold Away, C. E. White model 35, American E-Z fold, or approved equal.

Fold-A-Way seats mounted over a wheelwell may have non-retractable seat belts in lieu of retractable seat belts.

All floor plans will have at least two seating positions that meet the FMVSS 225 latch system requirement for child safety seats. They will be located on fixed seats and must be designated safety seat locations. The preferred location of these positions will be on the aisle side of two-passenger seats. All FMVSS 225 seating positions will have a non-retractable 60" lap belt.

For Floor Plan GG – since this floor plan has no fixed seats, the minimum two (2) FMVSS 225 child restraint system (CRS) latches will be located on two (2) separate fold-a-way seats.

For Floor Plan LL – this floor plan has two (2) fixed seats for two passengers each. If these two fixed seats together cannot each accommodate a FMVSS 225 latch position due to the presence of an Integrated Child Seat, then the second FMVSS 225 latch position may be located in a fold-a-way seat.

NOTE - All folding or fold-a-way seats will be two passengers.

Floor Plan Descriptions

Exhibit "AA" – This plan will provide for 12 two-passenger forward facing seats to allow for a total ambulatory capacity of 24. There will be no lift or wheelchair positions.

Exhibit "CC" – This arrangement shall provide 7 two-passenger forward facing seats to allow for ambulatory capacity of 14 adults. There will also be two forward facing wheelchair positions along with three folding seats to be located at wheelchair positions. Vehicles in fixed route transit service over 22 feet in length (Floor Plan CC with ADA option package) must have two (2) securement locations. Vehicles are to be measured from the front-most part to the rear-most item (including the bumpers). [49 CFR Part 38.23(a)]

Exhibit "DD" - this plan consists of 10 two-passenger forward facing seats allowing for a total ambulatory capacity for 20 adults. There are no wheelchair positions or wheelchair lift.

Exhibit "FF" - this floor plan requires four two-passenger seats permanently affixed to the floor and three wheelchair positions. The bus will be lift equipped, and the first, second, and third wheelchair positions will be forward facing and permanent. There will be a single seat mounted over the wheelwell or on the driver's side in the rear of the vehicle.

Exhibit "GG" - this plan requires a raised floor. Four (4) wheelchair positions will be located behind the driver with a fifth (5^{th}) position located at the rear of the bus curbside. There will be two (2) two-passenger fold-a-way seats located on the curbside behind the lift. Total capacity five (5) wheelchairs with seating for four (4) ambulatory. Delete the Integrated Child seat requirement, the CRS requirement remains.

Exhibit "HH" - this floor plan will provide two permanent wheelchair positions. The lift will be located at the right rear of the bus and all permanent ambulatory seating will be located towards the front (16 passenger ambulatory capacity).

Exhibit "II" - this floor plan will be similar to "HH" except it will seat 12 ambulatory instead of 16.

Exhibit "JJ" – This floor plan will provide four two-passenger seats on the lift side of the vehicle and five two-passenger fold-a-way seats on the driver's side of the vehicle. One one-passenger fixed seat will be located on the wheel well on the driver's side, or in the rear of the vehicle on the driver's side. Three in line wheelchair positions will be required on the driver's side of the vehicle.

Exhibit "LL" – this floor plan will utilize four (4) two-passenger fold-a-way seats on the street side and two (2) two-passenger fixed seats on the curb side. This floor plan will require a raised floor. Wheelchair positions and lift area will be as shown on Exhibit LL. (Note – wheelchair securement belt floor tracks will extend to the back wall of the vehicle.)

5. Windshield, Door Glass and Window Glass - Safety plate windshield and window glass all around.

The windshield shall be fixed glass.

Passenger side windows shall be provided throughout the passenger area. These windows will be a horizontal opening type that easily open and close. These windows shall meet all the latest federal regulations for retention and release. Kick-out type windows will be hinged at the top. All windows that are considered as emergency exits will be clearly marked. A full-length drip molding of at least 3/4" will be installed over each passenger window opening.

The driver position, on buses with right hand front entrance door only, shall have a window that can be opened for ventilation at the left side.

The dual right hand passenger entrance doors shall have full-length windows that will allow the driver to judge curb location.

The emergency rear door shall have an upper and lower fixed glass.

There will be glass on each side of the emergency door, approximately 24" x 24" or 7" x 30".

The windshield, driver position side window, and rear emergency door glass will be tinted. The passenger entrance door glass will be tinted in the upper part and may be clear in the lower part.

All passenger area side window glass will be tinted. An approximate tinting of 30% light transfer is acceptable.

All sliding side windows will have inside latches for security.

All windows, doors, and windshield will be installed to keep water and dust leakage to an absolute minimum. Proper sealing during installation is essential.

6. Doors

One door RH or two doors LH and RH acceptable.

Entrance LH - This door shall be the chassis manufacturer's standard front side door with tinted drop glass armrest and lock. This door may be modified if necessary.

Entrance RH - Main service door may be either forward folding, in-out or out-out opening type. This door shall provide no stoop entry headroom with a minimum of 72" entrance height from the top of the first entrance step to the door headliners. The minimum width shall be a 24". The top of the door entrance shall be fully enclosed and protected from weather and other elements. It shall have protective padding to prevent head injury when entering or exiting.

All vehicles will have an electrically operated door. The electric door will also be forward folding, in out or out-out opening type. This door will be operated by a switch from the driver's areas. There will also be a key activated switch on the right exterior of the bus so the door can be opened from the outside. The door and control arms will be located above the door area, not beneath the stepwell.

Either door shall have a below floor level entrance stepwell, with a minimum of two steps. These steps shall be stationery, corrosion resistant steel adequately braced and be an integral part of the basic structure. The height from ground to top of first step of empty vehicle be a maximum of 13-1/2" and a minimum of 10". Additional step heights will be a maximum of 11", the head depth for all steps shall be a minimum of 8". All of the steps shall be level and the risers shall be vertical or slightly angled.

Each step will be covered with molded rubber or vinyl. The step covering will be non-skid type tread with white or yellow nosing. The riser shall be covered, painted, or coated with scuff resistant material.

These steps will be fully recessed, enclosed and protected from weather and other elements. Door sweeps or flaps will be installed on bottom edges of doors. The bottom step of the stepwell may protrude below the door, but the door must incorporate a door sweep or flap on the bottom edge of the door.

A stepwell light shall be provided and automatically operated by door control.

The entire door shall be weather stripped to provide a water and airtight seal. The door edge seals will be the over-lapping type to provide maximum sealing ability.

The door opening shall be structurally reinforced to have the same structural integrity as the body.

(If Required) RH side lift door or doors –(with window) This entranceway may have either single or dual swing-out type door or doors (double doors preferred). Positive exterior latch(es) will be provided to keep door(s) open during lift operations.

The door(s) height extended from the floor to the top and side-to-side of the entranceway shall provide adequate clearance for the ramp and wheelchair entry. (68" minimum)

This entranceway will be located forward in the right hand side of the body, across from the wheelchair securement area or in the rear of the bus, along the curbside. Please note lift position in each floor plan.

Lift door will meet all requirements of ADA 49 CFR 38.25.

The height of doors at accessible entrances and the interior height along the path of travel between accessible entrances and securement areas shall be as follows:

- For vehicles 22 feet or longer, the clearance from the raised lift platform or the ramp surface to the top of the door must be at least 68 inches.
- For vehicles less than 22 feet, the overhead clearance must be at least 56 inches.

[49 CFR Part 38.25(c)]

The entranceway shall be protected from weather and other elements and be padded to prevent head and other injuries to passengers when exiting or entering.

Rear Emergency Door - This door shall be outward opening type, clearly marked as exits. The dimensions of this door will be approximately 32" wide and 50" high. This door shall have an open door warning buzzer and will be sealed to minimize dust and moisture entry. A red light will be installed to meet Federal Motor Carrier Safety regulations (49 CFR 393.92).

This door opening shall have protective padding to prevent head injury when exiting.

The rear emergency door must have an inside latch and release mechanism and outside handle. This door shall have factory installed position hold and check arm. Vehicles will have a warning device (buzzer) that indicates a locked rear emergency door. Emergency door will have an inside lock. Warning device will meet all FMVSS requirements. All doors will meet ADA requirement 49 CFR 38.25.

Door Lock System - The bus shall have a security door lock system for all doors.

7. Wheelchair Lift (if required)

The lift shall be an electrohydraulic type providing power-up, power or gravity down and power automatic fold. The power source shall be the vehicle 12-volt electrical system. The lift will be mounted within the body with access through the right hand side load door or doors. Modifications for the lift installation must not affect the structural integrity of the basic vehicle.

The lift shall have a minimum rated working load capacity of 800 lbs.

The design load of a lift must be at least 800 pounds, per MoDOT specifications. Working parts must have a safety factor of at least six Non-working parts shall have a safety factor of at least three [49 CFR Part 38.23(b)(1)]

The lift will have no dirty or greasy surfaces that will contact the wheelchair occupant during normal operation.

The platform surface must be slip resistant with no protrusions over 1/4 inch. [49 CFR Part 38.23(b)(6)]

The lift platform shall be constructed of expanded metal with a minimum usable width of 33" and a minimum depth of 51".

The platform must be at least 28 1/2-inches wide measured at the platform surface and at least 30 inches wide measured from 2 inches above the platform surface to 30 inches above the surface. It must also be at least 48 inches long measured from 2 inches above the surface to 30 inches above the surface. [49 CFR Part 38.23(b)(6)]

Gaps between the platform surface and any barrier can be no more than 5/8 inch. Semi-automatic lifts can have a handhold in the platform that measures no more than 1 1/2 inches by 4 1/2 inches. [49 CFR Part 38.23(b)(7)]

When in the fully raised position, the platform surface must be vertically within 5/8 inch of the finished floor and horizontally within 1/2 inch of the finished floor. [49 CFR Part 38.23(b)(7)]

The platform must not deflect more than 3 degrees in any direction when a 600-pound load is placed on the center of the platform. [49 CFR Part 38.23(b)(9)]

The platform must raise or lower in no more than 6 inches per second. The platform must be stowed or deployed in no more than 12 inches per second. Horizontal acceleration can be no more than 0.3 g. [49 CFR Part 38.23(b)(10)]

Components of a lift must be designed to allow boarding in either direction. [49 CFR Part 38.23(b)(11)]

The lift shall have the following:

A manual override to lower, to raise and an emergency platform release for use in the event of power failure. The pump handle will be able to function without interference from interior obstructions.

Lifts must be equipped with an emergency backup system. The emergency backup system shall be capable of being operated both up and down without the platforms "stowing" while occupied. [49 CFR Part 38.23(b)(3)]

Must be designed so that in the event of a power failure, the platform cannot fall faster than 12 inches per second. [49 CFR Part 38.23(b)(4)]

On lift platform operation, the platform shall have a device that will lock in an upward position acting as a curb as the platform is departing ground level and pivots downward upon ground contact, acting as an entry ramp. There will also be a similar safety barrier on the inboard side of the lift platform. Both barriers shall be a minimum of 6" in height.

There shall be a door activated power cutoff device to prevent movement of the lift when vehicle doors are closed.

Two handrails for use by the wheelchair occupant or standee. These rails shall automatically fold up or down with platform movement and shall fold flat against the platform during transport.

Must be equipped with two handrails that move in tandem with the lift platform. Handrails must be 30-38 inches above the platform surface and must have a useable grasping area of at least 8 inches. Handrails must be capable of supporting 100 pounds, must have a cross-sectional diameter of 1 1/4 to 1 1/2 inches, and must have at least 1 1/2 inches of "knuckle clearance." [49 CFR Part 38.23(b)(13)]

Lifts may be marked to identify the preferred standing position. [49 CFR Part 38.23(b)(12)] Note – these standing position markings are not specified by MoDOT, but are acceptable, if provided.

An automatic down pressure cutoff device shall stop downward movement of the platform upon contact with any obstruction or the ground.

The lift shall have automatic controls to perform all functions. The control shall be a hand held, cord mounted console control, with sufficient cord length to allow operator to control the lift from inside or outside the vehicle.

Controls must be interlocked with the brakes, transmission, or door so that the vehicle cannot move unless the interlock is engaged. [49 CFR Part 38.23(b)(2)(i)]

Controls must be "momentary contact type" (meaning they require constant pressure) and must allow the up/down cycle to be reversed without causing the platform to "stow" while occupied. [49 CFR Part 38.23(b)(2)(i)]

Any part of the lift assembly protruding into the body that could be hazardous must be properly padded for passenger protection. This includes the lift end barrier. Manufacturers flexible end barrier meets these requirements.

Must have an inner barrier or inherent design feature to prevent the mobility aid from rolling off the side closest to the vehicle until the platform is in its fully raised position. [49 CFR Part 38.23(b)(5)]

Side barriers must be at least 1 1/2 inches high. [49 CFR Part 38.23(b)(5)]

The "loading-edge" (or outer) barrier shall be sufficient to prevent a power wheelchair from riding over or otherwise defeating it. If this barrier is automatic, it must close when the platform is no more than 3 inches off the ground. If the outer barrier is to be driver operated, it must have an interlock or inherent design that prevents the platform from being raised until the barrier is closed or other system is engaged. [49 CFR Part 38.23(b)(5)]

The electrohydraulic lift system shall have a monitoring device requiring no tools to allow for fluid level check.

The lift system and mechanisms must be easily accessible for repair and maintenance without dismantling and removal from body. The lift circuit breakers or fuses will be mounted near the second battery and in the battery box.

The lift will be a S-5510, S 2010, series Ricon, Maxon WL-7, Braun Millennium or Century Series 2, or approved equal.

These lifts will have nine interlocks as defined in FMVSS 403.

The lift must provide either a safety belt occupant restraint system inter-locked to lift operation or an outside end barrier that locks in place before the lift platform leaves the ground more than 4". Both systems are to reduce the chances of a lift passenger falling or rolling off the lift platform during lift operation.

All lifts will meet ADA requirement 49 CFR 38.23

8. Wheelchair Securement System and Area

Each wheelchair tie down securement area shall be equipped with a minimum of four (4) wheelchair restraint securement belts designed to meet all ADA requirements and 30-mph / 20 g-force impact.

Securement systems must have the following design loads:

- For vehicle with a GVWR of 30,000 pounds or more: 2,000 pounds for each strap/clamp and 4,000 pounds per mobility aid.
- For vehicles with a GVWR of less than 30,000 pounds: 2,500 pounds per clamp/strap and 5,000 pounds per mobility aid.

[49 CFR Part 38.23(d)(1)]

Wheelchairs and mobility aids must be oriented as follows:

- For vehicles greater than 22 feet in length, at least one securement position must be forward facing. Other securement areas can be either forward or rear facing. Note – MoDOT only specifies forward facing securement positions.

Securement area must be located as close to the accessible entrance as possible. [49 CFR Part 38.23(d)(2)]

A sign must be provided which indicates that the securement area is to be used by persons who use wheelchairs and mobility aids. Characters on these signs shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Minimum character height (using a capital X) shall be 5/8 inch. Wide spacing shall be used (generally the space between letters shall be 1/16 the height of upper case letters). Letters must contrast with the sign's background color. [49 CFR Part 38.27(b), 49 CFR Part 38.27(c)]

A clear floor area of 30 inches wide by 48 inches long must be provided for each securement area. This can include an area up to 6 inches under a seat as long as there is a vertical clearance of at least 9 inches. If flip-seats are utilized, they cannot obstruct the required floor area. The required floor area can overlap the access path (the path of travel from the accessible entrance to the securement area). [49 CFR Part 38.23(d)(2)]

The wheelchair securement tie down belts shall be retractable into a protected steel housing and eliminate the need for belt cleaning and storage. The belt housing and mechanical retractor shall be designed for a minimum of five (5) year life. Belts will incorporate a S-hook or J-hook design to secure belts to the mobility aid. Include four (4) 16” "quick straps", or approved equal for each securement location.

The location of the rear belts shall be positioned to allow the driver to secure the wheelchair frame between the rear wheelchair wheels. The retractable belts shall feature positive locking mechanisms. The belts shall be equipped with a release tab to release tension on the belts when unfastening the wheelchair and to take up the excess belt when securing the wheelchair.

The retractable belts shall feature positive locking mechanisms and be fully automatic. Once the front belts have been attached to the wheelchair frame, a and tensioned knob attached to all belt housings shall be applied to bring the wheelchair passenger and chair into a state of securement. All belts shall be designed for a minimum life of five (5) years. All belts will utilize a flush floor mount L-Track with flanged edges for securment to the floor. Sure-Lok Titan tie-downs and Q Straint Deluxe are an “approved equals”.

The wheelchair occupant restraints shall be FMVSS Type II (combination lap and shoulder belt) with an adjustable height shoulder belt featuring a single-point release buckle for quick release at hip point. This system will also be fully retractable. Include on 20" lap belt extension for each wheelchair position.

A seat belt and shoulder harness must be provided for each securement position. The seat belt and shoulder harness must be separate from the securement system for the mobility aid. [49 CFR Part 38.23(d)(7)]

Include one set of the following: (or combination of to make one complete occupant restraint set) Sure-Lok AL 700842, FE 200637-020-05, and FE 200732; Q-Straint Q8-6325A (or approved equal) for <u>one</u> wheelchair position.

The restraint system shall be so designed, configured and installed as to accommodate the greatest possible variety of wheelchair designs and sizes. There will be wall-mounted pouches for storing all belts and securement devices.

The securement system must accommodate all common wheelchairs and mobility aids (any mobility aid not exceeding 30 inches in width and 48 inches in length and weighing no more than 600 pounds when occupied) and be operable by someone with average dexterity that is familiar with the system. [49 CFR Part 38.23(d)(3)]

Securement systems must keep mobility aids from moving no more than 2 inches in any direction. [49 CFR Part 38.23(d)(5)]

The securement system must be located to be readily accessed when needed but must not interfere with passenger movement or be a hazard to passengers. It should also be reasonably protected from vandalism. [49 CFR Part 38.23(d)(6)]

Use of the restraint system under normal conditions shall not cause any damage to the mobility aid.

The (2) after and the (2) forward restraints shall be securely anchored to the vehicle seating components or to anchor floor points and all belts shall be retracted back into their cases for storage, organization, and cleanliness when not in use. There shall be four tracks running the entire <u>length</u> of the securement area. (Except Floor Plans GG rear positions, HH, and II. These plans will have tracks that run the entire <u>width</u> of the securement area. Full LENGTH wheelchair and shoulder harness track requirements only apply when two or more wheelchair positions are located in-line (in-front / behind each other). Full WIDTH tracks apply for single or side by side wheelchair positions.

Spacing of these tracks shall provide a safe and efficient anchor point for the retractors.

On Floor Plans CC, FF, GG, JJ, and LL the shoulder belt L-tracks will run the entire length of the securement stations with wheelchairs located in front of each other. Floor tracks on Floor Plan LL must extend to the back wall of the vehicle.

All belts and belt anchor points shall be strong enough to comply with FMVSS 210 and FMVSS 222.

All belts shall feature positive locking mechanisms to ensure passenger security.

All wheelchair tie down belts shall have adjustable tensioners.

Easy to secure and release torso pads which encompass both the wheelchair and occupant shall be included for each wheelchair position. All securement devices and lift area designs will meet ADA requirement 49 CFR 38.23.

9. Air Conditioning, Heating, Defrosting and Cooling - Front and Rear

Heating and Defrosting - The high out-put heating system shall consist of front units to provide heat in the driver's, the entranceway and surrounding area. Underseat units shall provide for passenger comfort in the rear compartment. They shall be floor mounted and provide a minimum of 30,000 BTU's. Rear unit will be floor (or wall) mounted and located behind the rear wheel wells. Rear heater is to have a two-speed fan switch (off, low, high). Front passenger compartment mounted auxiliary are not acceptable.

The OEM defrosting and defogging system shall keep the windshield and all windows free of frost and condensation.

The system shall be supplied with hot water from the vehicle engine. Shut-off valves shall be provided and easily accessed from under the hood or body and be clearly labeled.

A description of the system and the BTU output will be included with all bids.

All controls shall be installed in a panel easily accessible to the driver.

Cooling - The system shall be powered by the vehicle engine and have a rated total output capacity of approximately 65,000 BTU's. All bolts used in mounting and securement of both compressors will be a grade 5 or higher. Hoses, fittings and clamps will be constructed to meet or exceed SAE specification J2064-Type D. Type C hoses, fitting and clamps are acceptable as long as they meet or exceed SAE specification J2064. The construction of the clamps will be of stainless steel and will be of a quick click or flex click design (or approved equal) to ensure coupling integrity. All aftermarket hoses will be nylon lined.

Free blow cool air distribution shall be mounted overhead of the passenger seats.

Adjustable air outlets to control and direct the flow of cooled air shall be installed for the comfort of passengers. The rear-cooling unit shall have a capacity of at least 53,000 BTU's. This rear-cooling unit will have a 3-speed fan control switch (off, low, medium, and high). Unit will be roof mounted and located of the very rear of the passenger compartment. Air circulation ducts will also be provided to give passengers in very rear of bus full comfort.

Chassis manufacturer's optional front air conditioning will be included. Approximately 12,000 BTU's.

This system will provide cooling in the front of the bus and have adjustable outlets for the driver to control and direct the flow of air.

The skirt-mounted condenser will be protected from debris thrown from tires by rustproof shields. There will be two, one located at the front and one located at the rear of the condenser.

All controls for fan speed and temperature shall be installed in a panel easily accessible to the driver.

For increased circulation in the driver area, a two-speed fan with a minimum diameter of 6" shall be mounted in the driver's area. (Not to block the driver's view.) The three-position (off, low, high) control switch will be located on the dash panel.

Roof Ventilator/Emergency Exit - A dual purpose manually operated roof ventilator/emergency exit shall be installed in the roof of the vehicle at approximately the center of the passenger compartment. The hatch shall be 23" x 23" minimum and shall be installed so that when it is open and the vehicle is in a forward motion fresh air will be provided inside the vehicle. Transpec Model 1075 Low profile, or an approved equal. Econo Model not acceptable.

Heating and Cooling Certification - The supplier must certify that the heating and cooling system he proposes to use will be adequate for passenger and driver comfort based on interior dimensions, anticipated passenger load, rural or urban service and any climatic condition that may be encountered in Missouri.

Ignition Cutoff - An automatic ignition body circuit cutoff for heaters, defroster, and air conditioning shall be provided.

10. Chassis and Body - Requirements and Performance

The chassis, fully loaded and equipped body, must provide proper weight distribution. The front and rear weights must not exceed the chassis manufacturer' gross axle weight rating. Vehicle will be checked for proper front-end alignment before delivery.

Front Section, Exterior - Shall have manufacturer's standard grill; grill frame, lamp moldings, etc.

Front Section, Interior - Shall have all items regularly furnished as standard by the manufacturer.

Lights and Signals

Exterior - High and low beam headlights, parking, tail, stop, backup, front and side marker lights or reflectors, license plate, hazard warning flashers, directional signals and daytime running lights. There will also be a reverse or back-up alarm.

Stop, tail, and turn lights will be LED design.

Lighting of at least 1 foot-candle shall be provided outside all doorways to illuminate the street surface for an area up to 3 feet perpendicular to the bottom step tread outer edge. Lighting shall be located below window level and shall be shielded to protect the eyes of entering and exiting passengers. [49 CFR Part 38.31(c)]

There will be two red strobe type lights mounted on the upper rear of the end cap that will be visible when doors are open (not roof mounted). They will be 6" in diameter.

The strobe lights will be activated only by a dash-mounted switch with a pilot light to indicate activation.

Interior - Instrument panel, front and rear overhead lights, and all doors. Overhead lighting activated by a dash mounted switch, shall provide lighting intensity at a reading level. All door lights and RH front door stepwell shall illuminate automatically when doors are open.

All interior lights shall be adequately recessed so as to not be a hazard to occupants. Interior light fixtures shall be operable with or without engine running. All interior and exterior lighting will meet ADA requirement 49 CFR 38.27.

Lighting of at least 2 foot-candles, measured on the step treads or lift platform, shall be provided in the step well or doorway immediately adjacent to the driver. Lighting shall activate when the door is opened. [49 CFR Part 38.31(a)] Other step well and doorways shall have similar lighting at all times. [49 CFR Part 38.31(b)]

All interior wiring shall be insulated and covered.

Instrument Panel and Instruments - Standard panel with gauge instrumentation for fuel, engine temperature, oil pressure, alternator, speedometer and odometer. All switches installed by body manufacturer will be a heavy-duty type. (push pull or rocker)

Mirrors, Rearview - Interior, adequate size to provide the driver a full view of the passenger area (approximate 6" x 12", 8" convex is acceptable).

Mirrors, Rearview Exterior (RH & LH) One piece or Separate –Heated, power adjustable type, approximate size 7" x 10". The mirrors must be mounted so as not to obstruct the driver's front or side vision. Convex mirrors of 5" in width will also be installed (RH and LH). Also include an 8" convex mirror mounted on the left-rear corner of vehicle to allow for a view directly behind bus. All bolts will be grade 5 or higher. OEM mounting hardware is acceptable. Mirrors will not vibrate during operation.

Windshield Wiper and Washer - Electric, two-speed with intermittent wipe option.

Tilt Steering Wheel and Cruise Control, Driver Sun Visor - Include in your bid price.

Storage Compartment – For personal items and/or valuables, a key-lockable storage compartment will be located immediately above the driver.

Radio - AM-FM, manufacturer's standard.

Engine - Gasoline V-8 or V-10, minimum of 275 horsepower, providing necessary horsepower and torque at governed R.P.M. for road speed and grade ability. The engine shall have a full flow replaceable or spin on type oil filter. The air filter shall be a dry type. The engine shall be equipped with oil cooler. Ford Chassis to include Super Duty service package and have the V-10 engine.

Fast Idle - Vehicle will be equipped with a Pentax Automatic or InterMotive AFIS Fast idle control solenoid, (or approved equal). Fast idle will operate under low voltage condition with or without parking brake activation.

Cooling System - Heavy duty or maximum cooling radiator with overflow recovery reservoir and permanent type anti-freeze installed to protect the vehicle to at least 20 degrees below zero.

Exhaust System - Exhaust to be discharged out diver's side on Floor Plans HH, II,and LL.

Transmission - Automatic, 4-speed or 5-speed with an electronic shift control, auxiliary exterior oil cooler and overdrive.

Alternator(s) - Minimum of 220 Amps cold. All mounting bolts will be grade 5 or higher. (May require dual alternators)

Batteries (2) - HD with adequate CCA and reserve capacity (Minimum 625 CCA) each for operating chassis and wheelchair lift components. One battery will be relocated so access can be gained through a door on the passenger side of the bus. Battery will be mounted on a slide out-tray to allow easy access. This tray will be sealed to prevent road debris from entering.

Steering – Power steering

Brakes - HD power, four-wheel front and rear disc system.

Axle, Front - Minimum of 4,300 lbs. capacity.

Axle, Rear - Minimum of 8,600 lbs. capacity, ratio 4.10/1 or 4.56/1. Include Mor Ryde, or approved equal.

Drive Shaft Guard(s) - Minimum requirement of one shaft guard per drive shaft section (FMCSR 393.89).

Springs, Front - Heavy-duty coil or leaf with a front stabilizer bar.

Springs, Rear - Heavy duty, leaf type, with stabilizer bar with Mor Ryde, or approved equal.

Shock Absorbers- Heavy duty, front and rear.

Fuel Tank or Tanks - Minimum capacity 33 gallons with outside fill spout.

Tires and Wheels - The tires and wheels will conform to the tire and rim association standards. They will be factory installed by truck manufacturing assembly. Acceptable tire makes will be those listed as being available in the tire section of manufacturer's Truck Data Book on specification date.

Mud Flaps - For both front and rear wheels.

Running Board – Vehicle will be equipped with one 11" wide by 36" long aluminum or galvanized steel running board mounted at the driver's door location. It will be a minimum of 1/8" thick and will have a diamond embossed or other anti-slip design on the footing area. This running board will be securely mounted with at least 3 braces made of galvanized steel to resist rust. A non-skid expanded metal will be installed on the entire step surface to prevent slipping. Diamond embossed only will not be acceptable. Running board design will allow for ample water drainage.

Tires - Tires will be a major brand, (preferably not Firestone) factory installed, metric sized, and meeting manufacturer's specifications and GVW requirements. Seven (front, dual rear and spare), approximate size LT 225/75R 16E, 10 PR, blackwall tubeless or tube type highway tread. Spare tire and wheel will be furnished. Spare tire is to be permanently mounted under vehicle unless weight or fuel tank is an issue.If tire is not mounted under vehicle, the exhaust will be discharged out driver's side. All tires including spare to meet or exceed GVW requirements, and be of radial design. A jack (rated for vehicle GVW) and all tire changing tools will be included with vehicle. All tire changing tools will be securely mounted anywhere in the passenger compartment, as long as it does not impede operation or safety. The jack and tire tools may be chassis supplied OEM. Tires will be mounted to allow easy air pressure checks. Tire valve stem extensions will be installed so operators can check tire pressure on BOTH rear duals with gauge when kneeling by rear tires.

Wheels - seven (7) disc with size and capacity to match load-carrying requirements of tire to vehicle.

Bumpers - Front and rear. The rear bumper ends will be positioned close to the body to minimize catching fixed objects as the bus moves forward in turns.

Undercoating - The entire body and chassis under structure shall be covered with a heavy, long lasting undercoating material. Automotive quality undercoating will not be acceptable. This undercoating will not interfere with OEM requirements.

Safety Equipment

Emergency Equipment - A fire extinguisher certified for this type vehicle (minimum 5 lb. 10-BC type) and a 16-unit first aid kit with contents recommended for this type and capacity vehicle shall be provided. Three reflective bi-directional triangles with 3 LED warning lights (Tri-Alert or approved equal) shall also be provided. These emergency items shall be securely mounted or shipped loose in the driver area and easily accessible. Also include an assortment of spare fuses used in chassis and body components along with an emergency seat belt cutter.

Each vehicle will have a blood borne disease kit including the following items:

A. Latex gloves
B. CPR mask
C. Goggles
D. Apron
E. Disinfectant wipes
F. Absorbent and scoop
G. I.D. tag and red plastic bag

All first aid and blood-borne disease kits will be packaged in a durable hard plastic or metal case.

11. Options:

A. Include as an option with all floor plans. Safety Vision SV 5000, Backing Vision BV 1350 (or approved equal) backing vision system.

B. Include as an option overhead storage compartment (with netting) located on the driver's side above the ambulatory seating. Streetside is first choice, curbside is acceptable, if streetside location interferes with securement area

C. ADA Option-Floor Plan CC, only. Include pricing for the following items. List as one price for the entire package. (First Item) Internal and external PA speaker system that meets ADA requirement 49 CFR 38.35.(Second Item) A passenger signal system (audible and visual) that is easily accessible to ambulatory and non-ambulatory passengers on each side. This system will meet ADA requirement 49 CFR 38.37. If pull cords are used, they will be made of vinyl coated cable. Third item will be front and side destinations signs that meet ADA requirement 49 CFR 38.36. They shall operate on 12 volts, be of LED design, programmable and capable of two line messages. (Luminator Vista, Twin Vision Mobil Lite or approved equal)

Vehicles in excess of 22 feet used in multiple-stop, fixed route service (CC with ADA option package) must be equipped with a public address system. [49 CFR Part 38.35(a)]

For vehicles in excess of 22 feet where passengers are permitted to exit at multiple stops at their option (CC with ADA option package), a "stop request" control must be provided adjacent to the securement locations. The system shall provide both auditory and visual indications that the stop has been requested. Controls shall be located from 15 to 48 inches above the floor, shall be operable with one hand, shall not require tight grasping, pinching, or twisting of the wrist, and shall be activated by a force no greater than 5 lbf. [49 CFR Part 38.37]

If destination or route information is displayed on the exterior of a vehicle (Floor Plan CC and OO with ADA option package), illuminated signs shall be provided at the front and boarding side of the vehicle. Characters on these signs shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Minimum character height (using a capital X) shall be 1 inch for signs on the boarding side and 2 inches for front "head signs." Wide spacing shall be used (generally the space between letters shall be 1/16 the height of upper case letters). Letters must contrast with background color. [49 CFR Part 38.39]

12. <u>The following must be furnished and included with your bid:</u>

A. Copy of the most recent Altoona Test Report.

B. A detailed drawing, showing interior floor plan, dimensions and seating arrangements.

C. Bidder will certify that vehicle meets all Federal Motor Carrier safety Regulations.

D. Priority seating signs that meet ADA requirement 49 CFR 38.27.

E. FMVSS 210 Seat Certification.

F. Descriptive literature and detailed specifications for lift system.

G. Description of air-conditioning, heating and defrosting systems.

H. Certification of adequacy of heating and cooling systems.

I. Buy America Pre Award information:

1. An itemized list of domestic produced parts or components used in the manufacturing of the vehicle.

2. The estimated cost for each item listed.

3. The estimated total percent of domestic components used in manufacturing of the vehicle.

4. Final assembly point and activities at that identified location

J. Statement of FMVSS compliance.

K. A complete listing and literature of all modifications of the vehicle.

L. A guarantee that the chassis manufacturer's warranty (minimum of 3 years or 36,000 miles) will be in effect at time of delivery and acceptance.

M. A copy or the warranty on the air conditioning, heating, wheelchair lift, alternator, and body. These components will have a minimum 2 year, 24,000 mile warranty.

13. **To be furnished with each vehicle at time of delivery**

A. An operator's manual for the basic chassis, body and other systems.

B. A parts book and maintenance manual for add on equipment used in modification.

C. MSO and title application. MoDOT will be shown as lien holder and end user agency will be shown as owner.
D. Documentation of front-end alignment and or alignment check.
E. A schematic of any installed wiring with each vehicle delivered,
F. A documented leak-free water test performed prior to delivery